CLAIMS

WE CLAIM

1. A titanium aluminide alloy for use in contact with a molten material comprising aluminum, said titanium aluminide alloy including a rare earth element in an effective amount to prolong resistance to attack of said alloy by the molten material.

2. The alloy of claim 1 wherein the rare earth element comprises Y.

3. The alloy of claim 2 wherein said Y is present in an amount of about 1.5% to about 5.5 % by weight of the alloy.

3. The alloy of claim 1 which comprises predominantly gamma TiAl.

4. The alloy of claim 1 that includes a surface oxide formed in-situ thereon.

5. The alloy of claim 4 wherein said surface oxide is formed in-situ by heating said alloy in an oxygen bearing atmosphere.

6. The alloy of claim 4 wherein said surface oxide is formed by cooling a hot casting comprising said alloy in air.

7. The alloy of claim 1 comprising TiAl that includes one or more additional alloying elements.

8. Tooling for use in contact with molten material comprising aluminum, wherein said tooling comprises the titanium aluminide alloy of any one of claims 1-7.

10. A method of increasing the service life of a titanium aluminide alloy in contact with a molten material comprising aluminum, comprising including in the titanium aluminide alloy a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material.

11. The method of claim 10 wherein said rare earth element is included in a predominantly gamma TiAl alloy.

12. The method of claim 10 wherein said rare earth element comprises Y included in an amount of about 1.5% to about 5.5 % by weight of the alloy.

13. The method of claim 10 including forming a surface oxide in-situ on the alloy.

14. The method of claim 13 wherein the surface oxide is formed by cooling a hot casting comprising said alloy in air.

15. The method of claim 13 wherein the surface oxide is formed in-situ by heating said alloy in an oxygen bearing atmosphere.

16. A method of prolonging resistance of a titanium aluminide alloy to a molten material comprising aluminum, comprising contacting the alloy for a time with said molten material, removing the alloy from the molten material, heating the alloy in an oxygen-bearing atmosphere at elevated superambient temperature to form a surface oxide thereon, and re-contacting the alloy having the surface film thereon in the molten material.

17. The method of claim 16 including prior to first contacting the alloy with the molten material, heating the alloy in an oxygen-bearing atmosphere at elevated temperature to form a surface oxide thereon.

18. The method of claim 16 including providing a rare earth element in the alloy.

19. The method of claim 18 wherein the rare earth element is provided in a predominantly gamma TiAl alloy.

20. The method of claim 18 wherein the rare earth element is Y.

21. In a method of die casting a molten material comprising aluminum, wherein said molten material is introduced into a die from a shot sleeve using a plunger in the shot sleeve, the improvement comprising providing one or more of said die, shot sleeve, and plunger as a titanium aluminide alloy including a rare earth element in an effective amount to prolong resistance to attack of said one or more of said die, shot sleeve and plunger by the molten material.

22. The method of claim 21 wherein said titanium aluminide alloy includes Y.

23. The method of claim 22 wherein said Y is present in said alloy in an amount of about 1.5% to about 5.5 % by weight of said alloy.

24. The method of claim 21 wherein a core element is disposed in the die and comprises said titanium aluminide alloy.